MATHS

BOOKS - KC SINHA ENGLISH

STRAIGHT LINES - FOR BOARDS

Solved Examples

1. What can be said regarding a line if its slope is i. positive ii. zero iii negative?

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2. Find the slope of a line whose inclination is 150°

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3. Find the inclination of the line having slope (i) -1

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4. Find the inclination of the line having slope (i) -3

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5. Find the slope of the line through the points $(4, -6)(-2, -5)$

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6. Show that the line joining (2,-3) and (-5,1) is parallel to the line joining (7,-1) and (0,3).

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7. Show that the line joining $(2, -3)$ and $(-5, 1)$ is : Perpendicular to the line joining $(4, 5)$ and $(0, -2)$

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8. Examine whether the line joining $(8, 2)$ and $(-5, 3)$ is parallel to or perpendicular to or neither parallel nor perpendicular to the line joining $(16, 6)$ and $(3, 15)$

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9. Without using the Pythagoras theorem, show that the points $(4, 4)$, $(3, 5)$and $(1, 1)$are the vertices of a right angled triangle.

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10. If points $(a, 0), (0, b) and (x, y)$ are collinear, using the concept of slope prove that $\frac{x}{a} + \frac{y}{b} = 1$.

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11. A quadrilateral has the vertices at the points $(-4, 2), (2, 6), (8, 5) and (9, -7)$. Show that the mid points of the sides of this quadrilateral are the vertices of a parallelogram.

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12. Prove that the line joining the mid-points of the two sides of a triangle is parallel to the third side.

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13. If $A(2, 0), B(0, 2) and C(0, 7)$ are three vertices, thaken in order, of an isosceles trapezium $ABCD$ in which $AB \mid\mid DC$. find the coordinates of D.

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14. In Figure, time and distance graph of a linear motion is given. Two positions of time and distance are recorded as, when T = 0, D = 2 and when T = 3, D = 8. Using die concept of slope, find law of motion, i.e., how distance depends upon time.

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15. Consider the following population and year graph: find the slope of the line AB and using it find what will be the population in the year 2010.

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16. Find the equation of the line parallel to the y-axis and 3 units to the right of it.

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17. Find the equation of the line parallel to x-axis and passing through the point $(3, -4)$.

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18. Find the equation of the line perpendicular to x-axis and having intercept -2 on x-axis.

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19. Find the equation of the line which cuts off an intercept -5 on y-axis and has slope $\frac{1}{2}$.

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20. Find the equation of the line which intersects the y-axis at a distance of 2 units above the origin and makes and angle of 30° with the positive direction of the x-axis.

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21. Find the equation of the straight line which makes angle of 15^0 with the positive direction of c-axis and which cuts and intercepts of length 4 length 4 on the negative direction of Y-axis.

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22. Find eqn of line which cut off an intercept of 4 units on the x- axis and makes an angle of 30° with positive direction of y- axis.

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23. Find the equation of the line passing through $(-4, 3)$ and having slope = $\frac{1}{2}$.

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24. Find the equation of the straight line which passes through the point $(1, 2)$ and makes an angle θ with the positive direction of x-axis where $\cos\theta = -\frac{1}{3}$.

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25. A line through the point $A(2, 0)$ which makes an angle of 30^0 with the positive direction of x-axis is rotated about A in clockwise direction through an angle 15^0. Find the equation of the straight line in the new position.

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26. Find the lines through the point (0,2) making angles $\frac{\pi}{3}$ and $\frac{2\pi}{3}$ with the x-axis. Also, find the lines parallel to the cutting the y-axis at a distance of 2 units below the origin.

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27. The mid-points of the sides of a triangle are $(2, 1), (-5, 7)$ and $(-5, -5)$. Find the equations of the sides of the triangle.

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28. If $A(1, 4), B(2, -3)$ and $C(-1, -2)$ are the vertices of a ΔABC. Find (i) the equation of the median through A (ii) the equation of the altitude through A. (iii) the right bisector of the side BC.

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29. Find the equation of the perpendicular bisector of the line segment joining the points (1,1) and (2,3).

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30. Show that the perpendicular drawn from the point $(4, 1)$ on the line segment joining $(6, 5) and (2, -1)$ divides it internally in the ratio $8:5$.

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31. One side of a square makes an angle α with x axis and one vertex of the square is at origin. Prove that the equations of its diagonals are $x(\sin\alpha + \cos\alpha) = y(\cos\alpha - \sin\alpha)$ or $x(\cos\alpha - \sin\alpha) + y(\sin\alpha + \cos\alpha) = a$, where a is the length of the side of the square.

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32. Find the equation of the line joining the points $(-1, 3) and (4, -2)$.

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33. Find the equations to the diagonals of the rectangle the equations of whose sides are $x = a, x = a', y = b \, and \, y = b'$

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34. Find the equation of the internal bisector of angle BAC of the triangle ABC whose vertices A, B, C are $(5, 2), (2, 3) and (6, 5)$ respectively.

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35. A rectangle has two opposite vertices at the points (1, 2) and (5,5). It these vertices lie on the line $x = 3$, find the other vertices of the

rectangle.

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36. In what ratio is the line joining the pints $(2, 3) and\ (4, -5)$ divided by the line passing through the points (6,8) and (-3,-2).

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37. Find the coordinates of the vertices of a square inscribed in the triangle with vertices $A(0, 0), B(3, 0) and C(2, 1);$ given that two of its vertices are on the side AB.

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38. Find the equation of the straight line which passes through the point $(3, 4)$ and whose intercept on y-axis is twice that on x-axis.

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39. A straight line moves so that the sum of the reciprocals of its intercepts made on axes is constant. Show that the line passes through a fixed point.

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40. Find the equations of the lines, which cut-off intercepts on the axes whose sum and product are 1 and -6, respectively.

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41. Find the equation of the lines which passes through the point (3,4) and cuts off intercepts from the coordinate axes such that their sum is 14.

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42. A line passes through the point (3,-2). Find the locus of the middle point of the portion the line intercepted between the axes.

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43. Find the equation of the line upon which the length of perpendicular p from origin and the angle $apha$ made by this perpendicular with the positive direction of x-axis are $p = 5, \alpha = 135^0$

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44. Sketch roughly the lines satisfying the given conditions and write their equations:

inclination $\theta = 150^\circ$, and distance from the origin = 3.

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45. Find the equation of the straight line upon which the length of perpendicular from origin is $3\sqrt{2}$ units and this perpendicular makes an angle of 75^0 with the positive direction of x-axis.

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46. Find the equation of the straight line upon which the length of the perpendicular from the origin is 2 and the slope of this perpendicular is $\frac{5}{12}$.

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47. A straight canal is at a distance of $4\frac{1}{2}$ km from a city and the nearest path from the city to the canal is in the north - east direction . Find whether a village which is at 3 km north and 4 km east from the city lies on the canal or not , then on which side of the canal is the village situated ?

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48. Find the equation of the straight line which makes a triangle of area $96\sqrt{3}$ with the axes and perpendicular from the origin to it makes an angle of 30^0 with y-axis.

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49. Find the equation of the line through $(-2, 1)$ in symmetric form when the angle made by the line with the positive direction of x-axis is 45^0

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50. find the equation of the straight line which passes through the point $(3, 2)$ and whose gradient is $\frac{3}{4}$.find the co-ordinate of the points on the line that are 5 units away from the point $(3, 2)$.

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51. Find the direction in which a straight line must be drawn through the point $(1, 2)$ so that its point of intersection with the line $x + y = 4$ may be at a distance of 3 units from this point.

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52. Find the coordinatse of the points at a distance $4\sqrt{2}$ units from the point $(-2, 3)$ in the direction making an angle of 45^0 with the positive direction of x-axis.

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53. The co-ordinates of the extremities of one diagonal of a square are $(1, 1)$ and $(1, -1)$ Find the co-ordinates of its other vertices and the equation of the other diagonal

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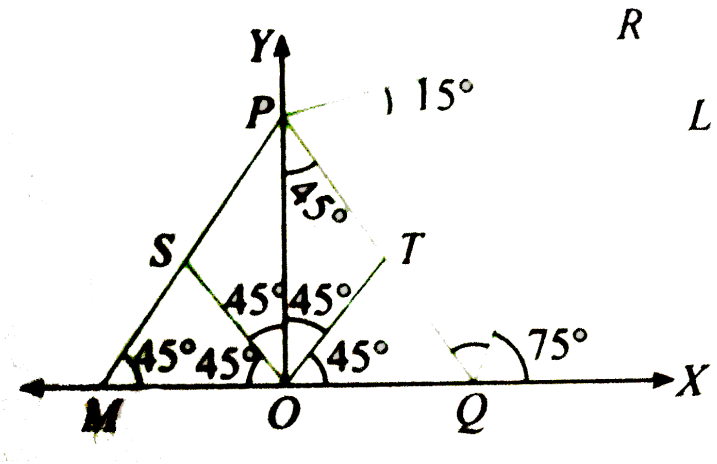
54. In the given figure, PQR is an euilateral triangle and OSPT is a square. If OT $= 2\sqrt{2}$ units, find the equation of lines OT, OS, SP, QR, PR, and PQ.



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55. The length L (in centimetre) of a copper rod is a linear function of its Celsius temperature C. In an experiment, if $L = 124.942$ when $C = 20$ and $L = 125.134$ when $C = 110$, express L in terms of C.

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56. The owner of a milk store finds that, he can sell 980 litres of milk each week a $Rs.\ 14/\text{litre}$ and 1220 litres of milk each week at $Rs16/\text{litre}$. Assuming a linear relationship between selling price and demand, how many lire could he sell weekly at $Rs17/litres$?

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57. Transform equation $\sqrt{3}y - 3x = 3$ to the slope intercept form and also find the angle which straight line makes with the x-axis.

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58. Reduce $x + \sqrt{3y} + 4 = 0$ to the :

(ii) Intercept form and find its intercepts on the axes

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59. Find the point of intersection of the line, $\frac{x}{3} - \frac{y}{4} = 0$ and $\frac{x}{2} + \frac{y}{3} = 1$

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60. Find the area of the triangle whose sides are: $3x - 2y + 1 = 0, 3x + y + 4 = 0$ and $3x - 5y + 34 = 0$

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61. The equation of the medians of a triangle formed by the lines $x + y - 6 = 0, x - 3y - 2 = 0$ and $5x - 3y + 2 = 0$ is

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62. Find the coordinates of the circumcentre of the triangle whose vertices are $(5, 7), (6, 6)$ and $(2, -2)$

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63. Show that the lines $4x + y - 9 = 0, x - 2y + 3 = 0, 5x - y - 6 = 0$ make equal intercepts on any line of slope 2.

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64. A line is such that its segment between the lines $5x - y + 4 = 0$ and $3x + 4y - 4 = 0$ is bisected at the point (1,5). Obtain its equation.

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65. Find the coordinates of the orthocentre of the triangle whose vertices are $(0, 1), (2, -1)$ and $(-1, 3)$

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66. Two vertices of a triangle are $(3, -1) and (-2, 3)$ and its orthocentre is at the origin,. Find the coordinates of eth third vertex.

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67. Two consecutive sides of a parallelogram are 4x+5y = 0 and 7x + 2y = 0. If the equation of one diagonal is 11x + 7y=9, find the equation of the other diagonal.

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68. Prove that the lines $\sqrt{3}x + y = 0, \sqrt{3}y + x = 0, \sqrt{3}x + y = 1 and \sqrt{3}y + x = 1$ form a rhombus.

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69. Prove that the straight lines 4x+7y=9, 5x-8y+15=0 and 9x-y+6=0 are concurrent.

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70. Find the value of p, so that three lines $3x + y = 2, px + 2y - 3 = 0$ and $2x - y = 3$ are concurrent.

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71. If the lines whose equations are $y = m_1x + c_1, y = m_2x + c_2$ and $y = m_3x + c_3$ meet in a point, then prove that : $m_1(c_2 - c_3) + m_2(c_3 - c_1) + m_3(c_1 - c_2) = 0$

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72. If the lines $p_1x + q_1y = 1, p_2x + q_2y = 1 and p_3x + q_3y = 1,$ be concurrent, show that the point $(p_1, q_1), (p_2, q_2) and (p_3, q_3)$ are collinear.

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73. The lines 1) $(p - q)x + (q - r)y + (r - p) = 0, 2)(q - r)x + (r - p)y + (p - q) = 0, 3$

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74. Prove analytically that the medians of a triangle are concurrent.

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75. Find the angle between the lines $y - \sqrt{3}x - 5 = 0$ and $\sqrt{3}y - x + 6 = 0.$

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76. Find the angle between the lines $x - 2y + 3 = 0$ and $3x + y - 1 = 0$.

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77. Find the angle between the lines $3x = 5$ and $3x + 5y - 2 = 0$.

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78. Find the angle between $x + y = 3$ and the line joining points (1,1) and (-3,4)

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79. Prove that the points (2,-1), (0,2), (2,3) and (4,0) are the coordinates other vertices of a parallelogram and find the angle between its

diagonals.

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80. Is the triangle, whose vertices are $(5, -6), (1, 2)$ and $(-7, -2)$, a right-angled triangle, an acute-angled triangle or an obtuse-angled triangle?

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81. Prove that that s triangle which has one of the angle as 30^0 cannot have all vertices with integral coordinates.

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82. Find the value of k if the straight line $2x + 3y + 4 + k(6x - y + 12) = 0$ is perpendicular to the line $7x + 5y - 4 = 0$.

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83. Examine the following pair of lines are intersecting, parallel, coincident or perpendicular : $x + y + 2 = 0$ and $2x + 2y - 7 = 0$

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84. Examine the following pair of lines are intersecting, parallel, coincident or perpendicular : $x + y + 2 = 0$ and $2x - 3y + 5 = 0$

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85. Examine the following pair of lines are intersecting, parallel, coincident or perpendicular $x + y + 2 = 0$ and $2x + 2y + 4 = 0$

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86. Examine the following pair of lines are intersecting, parallel, coincident or perpendicular $2x + y + 2 = 0$ and $x - 2y + 5 = 0$

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87. If $A(2, 0), B(0, 2) and C(0, 7)$ are three vertices, thaken in order, of an isosceles trapezium $ABCD$ in which $AB \| DC$. find the coordinates of D.

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89. A ,B and C are the points $(2, 0), (5, 0)$ and $(5, 3)$ respectively. Find coordinates of D such that $ABCD$ is a square.

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90. If the angle between two lines is $\frac{\pi}{4}$ and slope of one of the lines is $\frac{1}{2}$, find the slope of the other line.

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91. Find the slope of the lines which make an angle of 45^0 with the line $3x - y + 5 = 0$.

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92. The line $2x - y = 5$ turns about the point on it, whose ordinate and abscissae are equal through an angle of 45° in the anti-clockwise direction. Find the equation of the line in the new position.

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93. Find the equation of the lines through the point (3, 2) which make an angle of $45o$with the line $x - 2y = 3$.

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94. A vertex of an equilateral triangle is (2,3) and the equation of the opposite side is x+y=2. Find the equation of the other sides of the triangle.

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95. Write the formula for the area of the triangle having its vertices at (x_1, y_1), (x_2, y_2) and (x_3, y_3).

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96. A line $4x + y = 1$ through the point $A(2, -7)$ meets the line BC whose equation os $3x = 4y + 1 = 0$ at the point B. Find the equation to

the line AC so that $AB = AC$.

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98. A ray of light is sent along the line $x - 2y - 3 = 0$ upon reaching the line $3x - 2y - 5 = 0$, the ray is reflected from it. Find the equation of the line containing the reflected ray.

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99. The equation of the line through (3, 4) and parallel to the line $y = 3x + 5$ is

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100. Find the equation of the straight line through (2, 3) and perpendicular to the line $4x - 3y = 10$

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101. The equation of the straight line passing through the point $\left(a\cos^3\theta, a\sin^3\theta\right)$ and perpendicular to the line $x\sec\theta + y\,\mathrm{cosec}\,\theta = a$ is (A) $x\cos\theta - y\sin\theta = a\cos 2\theta$ (B) $x\cos\theta + y\sin\theta = a\cos 2\theta$ (C) $x\sin\theta + y\cos\theta = a\cos 2\theta$ (D) none of these

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102. Find the equation of a straight line perpendicular to the line $x - 2y + 3 = 0$ and having intercept 3 on x-axis.

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103. Find the equation of the straight line which has y-intercept equal to 4/3 and is perpendicular to $3x - 4y + 11 = 0$.

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104. Find coordinates of the foot of perpendicular, image and equation of perpendicular drawn from the point $(2, 3)$ to the line $y = 3x - 4$.

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105. Find the image of the point $(-8, 12)$ with respect to line mirror $4x + 7y + 13 = 0$.

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106. The equations of two sides of a triangle are $3x - 2y + 6 = 0 \; and \; 4x + 5y - 20 \; and$ the orthocentre is (1,1). Find the

equation of the third side.

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107. One side of a rectangle lies along the line 4x+7y+5=0. Two of its vertices are (-3,1) and (1,1). Find the equations of the other three sides.

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108. The equations of perpendicular bisectors o the sides AB and AC of a triangle ABC are $x - y + 5 = 0\ and\ x + 2y = 0$ respectively. If the point $A\ is\ (1, -2)$, find the equation of the line BC.

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109. Find the equation of the straight line which passes through the point $(2, -2)$ and the point of intersection of the lines $5x - y = 9$ and $x + 6y = 8$.

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110. Find the equation of the straight line which passes through the intersection of the lines $x - y - 1 = 0$ *and* $2x - 3y + 1 = 0$ and parallel (i) x-axis (ii)y-axis (iii) 3x+4y=14.`

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111. Find the equation of the straight line which passes through the point of intersection of lines $3x - 4y - 7 = 0$ and $12x - 5y - 13 = 0$ and is perpendicular to the line $2x - 3y + 5 = 0$

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112. Find the equations of the straight lines passing through the point of intersection of the lines $x + 3y + 4 = 0$ and $3x + y + 4 = 0$ and equally inclined to the axes.

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113. Coordinates of the orthocentre of the triangle whose sides are 3x -2y = 6, 3x + 4y + 12 = 0 and 3x-8y+12=0 is

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115. Show that the straight lines given by $x(a+2b)+y(a+3b)=a$ for different values of a and b pass through a fixed point.

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116. A straight line moves so that the sum of the reciprocals of its intercepts made on axes is constant. Show that the line passes through a

fixed point.

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117. Find the position of the points $(1, 1)$ and $(2, -1)$ with respect to the line $3x + 4y - 6 = 0$.

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118. The ratio in which the line segment joining $P(x_1, y_1)$ and $Q(x_2, y_2)$ is divided by x-axis is (a) $y_1 : y_2$ (b) $y_1 : y_2$ (c) $x_1 : x_2$ (d) $x_1 : x_2$

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119. Find the distance of the point (4,5) from the straight line $3x - 5y + 7 = 0$

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120. If the equation of the base of an equilateral triangle is $x + y = 2$ and the vertex is $(2, -1)$ then find the length of the side of the triangle.

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121. Find the equation of the straight line which cuts off intercept on X-axis which is twice that on Y-axis and is at a unit distance from the origin.

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122. If p and q are the lengths of perpendiculars from the origin to the lines $x\cos\theta - y\sin\theta = k\cos 2\theta$ and $x\sec\theta + y\ \text{cosec}\theta = k$, respectively, prove that $p^2 + 4q^2 = k^2$.

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123. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b, then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.

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124. Line L has intercepts $aandb$ on the coordinate axes. When the axes are rotated through a given angle keeping the origin fixed, the same line L has intercepts $pandq$. Then $a^2 + b^2 = p^2 + q^2$ $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{p^2} + \frac{1}{q^2}$ $a^2 + p^2 = b^2 + q^2$ (d) $\frac{1}{a^2} + \frac{1}{p^2} = \frac{1}{b^2} + \frac{1}{q^2}$

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125. Prove that the length of perpendiculars from points 'P(m^2,2m) Q (mn ,m+n) and R(n^2,2n)' to the line $x\cos^2\theta + y\sin\theta\cos\theta + \sin^2\theta = 0$ are in G.P.

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126. Find the distance of the point (1,2) from the straight line with slope 5 and passing through the point of intersection of $x + 2y = 5 \, and \, x - 3y = 7.$

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127. The vertices of a triangle are $A(-2, 1), B(6, -2)$ and $C(4, 3).$ Find the equation of the altitudes of the triangle.

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128. Find the distance between the parallel lines $ax + by + c = 0$ and $ax + by + d = 0$

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129. Prove that the line $12x - 5y - 3 = 0$ is mid-parallel to the lines $12x - 5y + 7 = 0$ and $12x - 5y - 13 = 0.$

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130. The equations of two sides of a square are $3x + 4y - 5 = 0$ and $3x + 4y - 15 = 0$ and (6, 5) is a point on the third side. Find the equation of the third side and the remaining side.

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131. Prove that the parallelogram formed by the lines $\frac{x}{a} + \frac{y}{b} = 1, \frac{x}{b} + \frac{y}{a} = 1, \frac{x}{a} + \frac{y}{b} = 2an\frac{dx}{b} + \frac{y}{a} = 2$ is a rhombus.

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132. Find area parallelogram lines $y = mx, y = mx + 1, y = nx$ and $y = nx + 1$ equal to:

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Exercise

1. What can be said regarding a line if its slope is i. positive ii. zero iii negative?

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2. Find the slope of a line if its inclination is $(i)30^\circ$, $(ii)135^\circ$.

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3. Find the slope of the line whose inclination is : 180^0

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4. Find the slope of a line whose inclination is 150°

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5. Find the slope of line whose inclination is 45°

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6. Find the slope of the line through the points: $(6, 3)$ and $(9, 3)$

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7. Find the slope of the line through the points: (1, 2) and (4, 2)

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8. Find the slope of the line through the points: $(0, 9)$ and $(-3, 0)$

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9. Find the slope of the line through the points: $(0, -4)$ and $(-6, 2)$

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10. Find the slope of the line through the points: $(3, -2)$ and $(3, 4)$

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11. Find the slope of the line through the points: $(3, -2)$ and $(-1, 4)$

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12. Find the slope of the line through the points: $(3, -2)$ and $(7, -2)$

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13. Show that the line joining (5, 6) and (2,3) is parallel to the line through $(9, -2)$ and $(6, -5)$.

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14. Show that the line joining (2,-5) and (-2, 5) is perpendicular to the line joining (6,3) and (1,1).

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15. Examine whether the two lines in each of the parallel, perpendicular or neither parallel nor perpendicular : through $(-2, 6)$ and $(4, 8)$, through (8, 12) and (4, 24`.

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16. State whether the tow lines in each of the following are parallel, perpendicular or nether: through (9,5) and (-1,1); through (3,-5) and (8,-3)

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17. $A(5, -3), B(8, 2), C(0, 0)$ are the vertices of a triangle. Show that the median from A is perpendicular to the side BC.

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18. What is the value of y so that the line through $(3, y) and (2, 7)$ is parallel to the line through $(-1, 4) and (0, 6)$?

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19. Line through the points (-2,6) and (4,80 is perpendicular to the line through the points (8,12) and $(x, 24)$. Find the value of x.

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20. Find the value of x for which the points $(x-1),\ (2,1) and\ (4,5)$ are collinear.

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21. Find the slope of the line, which makes an angle of 30° with the positive direction of Y-axis measured anticlockwise.

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22. Find the slope of the line which passes through the origin and the mid-point of the line segment joining the points $A(0,\ -4)$ and $B(8,0)$.

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23. Find the angle between the X-axis and the line joining the points $(3, -1) and (4, -2)$.

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24. A line passes through $(x_1, y_1)$and (h, k). If slope of the line is m, show that $k - y_1 = m(h - x_1)$.

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25. Using slopes, show that thepoints (1, 1), (2, 3) and (3, 5) are collinear.

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26. $A(3, 4), B(-3, 0)$ and $C(7, -4)$ are the vertices of a triangle. Show that the line joining the mid-points

$D(x_1, y_1), E(x_2, y_2)$ and $F(x, y)$ are collinear. Prove that $(x - x_1)(y_2 - y_1) = (x_2 - x_1)(y - y_1)$

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27. By using the concept of slope, show that the points (-2,-10, (4,0), (3,3) and (-3,2) are the vertices f a parallelogram.

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29. Using the concept of slope, prove that medians of an equilateral triangle are perpendicular to the corresponding sides.

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30. Show that the diagonals of a rhombus bisect each other at right angles.

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31. Write down the equation of the following lines: A line parallel to x-axis at a distance of 3 units below x-axis.

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32. Find the equation of a line parallel to x-axis and passing through the origin.

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33. Find the equation of the straight lines which are : parallel to the x-axis at a distance of 5 units from it

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34. Find the equation of the straight lines which are : parallel to the y-axis and at a distance of 4 units from it towards negative side of x-axis.

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35. Find the equations of the straight lines which pass through (4,3) and are respectively parallel and perpendicular to the x-axis.

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36. Find the equation of the line which is parallel to yl-axis and passes through the point $(3, -4)$.

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37. Find the equation of the line perpendicular to the x-axis and passing through the point $(-1, , -1)$.

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38. Find the equation of the line parallel to x-axis of and having intercept -2 on y-axis.

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39. Find the equation of the line with slope 3 and y intercept -2.

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40. Find the equation of the line which cuts off an intercept 7 on y-axis and has the slope 3.

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41. Find the equation of the line which makes an angle of 75^0 with x-axis and cuts an intercept of length 3 on the positive direction of y-axis.

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42. Find the equation of the straight lines which cut off an intercept 4 from the y-axis and are equally inclined to the axes.

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43. Find the equation of the straight line which cuts off an intercept-5 from the y-axis and makes an angle of $\sin^{-1}\left(\frac{12}{13}\right)$ with the x-axis.

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45. Find the equation of a line which cuts off an intercept 4 on the x-axis and has the slope 2.

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46. Find the equation of the line for which $\tan\theta = \frac{1}{2}$, where θ is the inclination of the line and i. x-intercept equal to 4. Ii. y-intercepts is $-\frac{3}{2}$.

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47. The perpendicular from the origin to the line $y = mx + c$ meets it at the point $(-1, 2)$. Find the value of m and c.

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48. The line through the points (h, 3) and (4, 1) intersects the line $7x - 9y - 19 = 0$ at right angle. Find the value of A.

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49. Find the values of k for which the line $(k-3)x - (4-k^2)y + k^2 - 7k + 6 = 0$is(a) Parallel to the xaxis,(b) Parallel to the y axis,(c) Passing through the origin.

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50. Find the equation of a line through the origin which makes an angle of 45^0 with the positive direction of x-axis.

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51. Find the equation of the line through the point $(-1, 2)$ and having slope 4.

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52. Find the equation of the line throught $(-2, 3)$ and having slope -4.

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53. Passing through $(0, 0)$ with slope m.

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54. Find the equation of the line passing through $(-4, 3)$ and having slope $\frac{1}{2}$.

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55. Find the equation of the line passing through the point (2, 2) and inclined to x-axis at 45^0.

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56. Find the eqution of the line passing through the point $(-1, -2)$ andhaving slope $\frac{4}{7}$.

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57. Find the equation of the linepassing through the point $(\sqrt{2}, 2\sqrt{2})$ and having slope $\frac{2}{3}$.

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58. Find the equation of the line which satisfy the given conditions : Intersecting the xaxis at a distance of 3 units to the left of origin with

slope -2.

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59. Find the eqution of a line which passes through the point $(-2, 3)$ and makes an angle of 60^0 with thepositive direction of x-axis.

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60. Find the equation of the straight line passing through (3,-2) and making an angle of 60^0 with the positive direction of y-axis.

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61. Find the eqn of lines which pass through the point (1, 2) and equally inclined to the co- ordinate axes.

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62. Find the equation of the straight line which passes through the point (1,2) and makes such an angle with the positive direction of x-axis whose sine is $\frac{3}{5}$.

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63. Find the slope of the line passing through the points (3, 4) and (1, 2). Also find its equation.

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64. Find the equation of the line passing through (-3,5) and perpendicular to the line through the points (2,5) and (-3,6).

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65. Find the equation of the right bisector of the line segment joining eth points $A(1, 0) and\ B(2, 3)$

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66. Find the equation of the right bisector of the line segment joining the points (3, 4) and (1, 2).

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67. The perpendicular from the origin to a line meets it at the point (-2, 9) find the equation of the line.

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68. A line perpendicular to the in segment joining the points (1,0) and (2,3) divides it in the ratio $1 : n$. Find the equation of the line.

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69. Find the equation of the line through the point (0, 2) making an angle $\frac{\pi}{6}$ with the positive x-axis. Also find the equation of the line parallel to it and crossing the y-axis at a distance of 2 units below the origin.

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70. Find the equation of the linepassing through the point $(2, 3)$ and $(5, -2)$.

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71. Find the equation of the line passing through the following pair of points $(0, -3)$ and $(5, 0)$

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72. Find the equation of the line passing through the pair of points: $(-1, 1)$ and $(2, -4)$

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73. Find the equation of the line passing through the pair of points: $(1, -1)$ and $(3, 5)$

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74. Find the equation of the straight line whichpasses throought the two points : $(a, b), (a + r\cos\alpha, b + r\sin\alpha)$

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75. Find the equation of the straight line whichpasses throought the two points : $\left(at_1^2, 2at_1\right), \left(at_2^2, 2at_2\right)$

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76. Find the equation of the sides of the triangle whose vertices are $(2, 1), (-2, 3)$ and $(4, 5)$

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77. By using the concept of equation of a line, prove that the three points $(3, 0)$, $(-2, -2)$ and $(8, 2)$ are collinear.

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78. The vertices of A PQR are $P\ (2, 1)$, $Q\ (2, 3)$ and $R\ (4, 5)$. Find equation of the median through the vertex R.

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79. The Fahrenheit temperature F and absolute temperature K satisfy a linear equation. Given that $K = 273$ when $F = 32$ and that $K = 373$ when $F = 212$. Express K in terms of F and find the value of F, when $K = 0$.

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80. Find the equation of the line whose intercepts on x and y axes are 2 and -3 respectively.

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81. Find the equation of the line, which makes intercepts -3, and 2 on the x and $y-axes$ respectively.

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82. Find the equation of the straight line whichpasses through the point (2, 3) and cuts off equal intercepts on the axes.

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83. Find the equation of the straight line which cuts off equal and positive intercepts from the axes andpasses through the point (3, 4).

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84. Find the equation of the line which cuts off equal and positive intercepts from the axes and passes through the point (α, β).

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85. Find the equation of the straight line which passes through the point (2, 3) and whose intercept on the x-axis is double that on the y-axis.

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86. Find the equation of the straight line which passes through the point (2, 3) and whose intercept on the y-axis is thrice that on the x-axis.

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87. Find the equation of the straight line passing through the point `(3, -4) and cutting off intercepts, equal but of opposite signs, from the axis.

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88. A straight line passes through the point (α, β) and this point bisects the portion of the line intercepted between the axes. Show that the equation of the straight line is $\frac{x}{2\alpha} + \frac{y}{2\beta} = 1$.

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89. Find the equation of the straight lines each of which passes through the point $(3, 2)$ and cuts off intercepts a and b respectively on x and y - axes such that $a - b = 2$.

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90. Find the equations to the straight lines which pass through the point $(-2, 3)$ and cut the axes at $A(a, 0)$ and $B(0, b)$ so that $a + b = 2$

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91. Find equation of the line passing through the point (2, 2) and cutting off intercepts on the axes whose sum is 9.

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92. A straight line passes through the point $(3, -2)$ and this point bisects theportion of the line intercepted between the axes, find the

equation of the line

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93. Point R (h, k) divides a line segment between the axis in the ratio $1:2$. Find equation of the line.

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94. Find the equation of the line which passes through $P(1, -7)$ and meets the axes at $AandB$ respectively so that $4AP - 3BP = 0$.

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96. For the straight line $\sqrt{3}y - 3x = 3$, find the intercepts on the x-axis and y-axis.

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97. Find the equation of the straight line whose intercepts on the axes are twice the intercepts of the straight line $3x + 4y = 6$.

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98. find the equation of the straight line passing through (2,1) and bisecting the portion of the straight line 3x-5y=15lying between the axes.

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99. Find the equations of the straight lines which pass through the origin and trisect the portion of the straight line $2x + 3y = 6$ which is

intercepted between the axes.

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100. Show that the three points (5, 1), (1, -1) and (11, 4) lie on a straight line. Further find

its intercepts on the axes

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101. find the gradient and intercepts on the axes of the straight line passing through the point $(1, -3)$ and $(4, 5)$.

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102. Find the equation of the line where the perpendicular distance p of the line from origin and the angle α made by the perpendicular with x-axis are given as: $p = 3, \alpha = 45^0$

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103. Find the equation of the line where the perpendicular distance p of the line from origin and the angle α made by the perpendicular with x-axis are given as: $p = 1, \alpha 90^0$

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104. Find the equation of the line where the perpendicular distance p of the line from origin and the angle α made by the perpendicular with x-axis are given as: $p = 1, \alpha = 90^0$

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105. Find the equation of the line where the perpendicular distance p of the line from origin and the angle α made by the perpendicular with x-axis are given as: $p = 4, \alpha = 15^0$

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106. Find the equation of the line which is at a perpendicular distance of 5 units from the origin and the angle made by the perpendicular with the positive x-axis is 30°.

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108. Find the equation of the straight line upon which the length of the perpendicular from the origin is 2 and this perpendicular makes an angle of 30^0 with the positive direction of y-axis (in clockwise direction`.

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109. Find the equation of the line which is at a distance 5 from the origin and the perpendicular from the origin to the line makes an angle 60^0 with thepositive direction of the x-axis.

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110. Find the equation of the straight line upon which the length of the perpendicular from the origin is $5 and$ the slope of this perpendicular is $\frac{3}{4}$.

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111. A straight road is at a distance of $5\sqrt{2}$ km from a place. The shortest distance of the road from the place is in the N.E. direction. Do the following villages which (i) is 6 km East and 4km North from the place lie on the road or no, (ii) is 4km East and 3km North from the place, lie on the road or not?

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112. Find the co-ordinates of the point at at a distance 6 units from the point $(1, 1)$ in the direction making an angle of 60° with the positive direction of the $x-$ axis.

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113. Find the direction in which a straight line must be drawn through the point $(1, 2)$so that its point of intersection with the line $x + y4$may be at a distance of 3 units from this point.

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114. Find the distance of the line $2x + y = 3$ from the point$(-1, \ -3)$ in the direction of the line whose slope is 1.

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115. Find the distance of the line $4x$ -y $=$ 0 from the point P(4, 1) measured along the line making an angle of $135o$ with the positive xaxis.

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116. The straight line through $P(x_1, y_1)$ inclined at an angle θ with the x-axis meets the line $ax + by + c = 0 \in Q$. Find the length of PQ.

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119. Find the distance of the line $4x + 7y + 5 = 0$ from the point $(1, 2)$ along the line $2x - y = 0$.

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120. The co-ordinates of the extremities of one diagonal of a square are $(1, 1)$ and $(-1, -1)$ Find the co-ordinates of its other vertices and the equation of the other diagonal

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121. AB is a side of a regular hexagon $ABCDEF$ and is of length a with A as the origin and AB and AE as the x-axis andy-axis respectively. Find the equation of lines AC, AF and BE

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122. Reduce the following equations into slope-intercept from $7x + 3y - 6 = 0$

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123. Reduce the following equations into slope-intercept from $6x + 3y - 5 = 0$

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124. Reduce the following equations into slope-intercept from (A) $3x + 3y = 5$

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125. Reduce the following equations into slope-intercept from $2x - 4y = 5$

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126. Reduce each of the following equations into slope-intercept from $y = 0$

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127. Reduce the following equations into slope intercept form and find their slopes and the y intercepts.(i) $x + 7y = 0$, (ii) $6x + 3y5 = 0$, (iii) $y = 0$.

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128. Reduce the equations to the intercept form $2x - 3y = 5$

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129. Reduce the equations to the intercept form $3x - 4y = 10$

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130. Reduce the equations to the intercept form $\sqrt{3}y - 3x = 3$

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131. Reduce the equations to the intercept form $4x - 3y = 6$

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132. Reduce the following equations into intercept form and find their intercepts on the axes.(i) $3x + 2y12 = 0$, (ii) $4x3y = 6$, (iii) $3y + 2 = 0$.

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133. Reduce the following equations into intercept form and find their intercepts on the axes.(i) $3x + 2y12 = 0$, (ii) $4x3y = 6$, (iii) $3y + 2 = 0$.

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134. Reduce each of the equations to the normal form and find the length of the perpendicular from origin to the line $\sqrt{3}x + y - 8 = 0$

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135. Reduce each of the equations to the normal form and find the length of the perpendicular from origin to the line $4x + 3y - 9 = 0$

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136. Reduce each of the equations to the normal form and find the length of the perpendicular from origin to the line $3x - 4y + 10 = 0$

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137. Reduce each of the equations to the normal form and find the length of the perpendicular from origin to the line $x + y - 2 = 0$

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138. Reduce the following equations to the normal form and find $p \, and \, \alpha$ in each case: $y - 2 = 0$

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139. Reduce each of the equations to the normal form and find the length of the perpendicular from origin to the line $x - 4 = 0$

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140. Reduce each of the equations to the normal form and find the length of the perpendicular from origin to the line $x - y = 4$

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141. Reduce each of the equations to the normal form and find the length of the perpendicular from origin to the line $x - \sqrt{3}y + 8 = 0$

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142. Reduce each of the equations to the normal form and find the length of the perpendicular from origin to the line $\sqrt{3}x + y + 2 = 0$

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143. Equation of a line is $3x - 4y + 10 = 0$. Find its (i) slope, (ii) x and yintercepts.

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144. For the straight line $8x - 15y + 51 = 0$, find the length of the perpendicular from the origin to this line and the inclination of this perpendicular with the x-axis.

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145. Find the equation of the line joining the points $(1, 2)$ and $(-3, 1)$. Find its inter-cepts on the axes. If p be the length of the perpendicular from the origin to the line find the value of p.

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146. Find the point of intersection of the lines $2x - 3y + 8 = 0$ and $4x + 5y = 6$

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147. Find the points of intersection of the following pair of lines: $2x + 3y - 6 = 0, 3x - 2y - 6 = 0$

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148. Find the points of intersection of the following pair of lines: $x = 0, 2x - y + 3 = 0$

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149. For what value of m the line $mx + 2y + 5 = 0$ will pass through the point of intersection of the lines $x - 4y = 3$ and $x + 2y = 0$?

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150. Find the point of intersection of lines : $yt_1 = x + at_1^2$ and $yt_2 = x + at_2^2$

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151. If the straight line $\frac{x}{a}+\frac{y}{b}=1$ passes through the line point of intersection of the lines $x+y=3$ and $2x-3y=1$ and is parallel to $x-y-6=0$, find a and b.

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152. Find the vertices and the area of the triangle whose sides are $x=y, y=2x$ and $y=3x+4$.

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153. The sides of a triangle are given by $x-2y+9=0, 3x+y-22=0$ and $x+5y+2=0$. Find the vertices of the triangle.

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154. Find the vertices of the triangle whose sides are $y + 2x = 3, 4y + x = 5$ and $5y + 3x = 0$

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155. Find the area of the triangle formed by the lines $y - x = 0, x + y = 0$and $x - k = 0.$

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156. If m_1 and m_2 are the roots of the equation

$x^2 + (\sqrt{3} + 2)x + (\sqrt{3} - 1) = 0$

Show that the ares of the triangle formed by the lines $y = m_1 x, y = m_2 x$ and y = c is $\left(\frac{\sqrt{3} + \sqrt{11}}{4}\right) c^2.$

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157. Three sides $AB, ACandCA$ of triangle ABC are $5x - 3y + 2 = 0, x - 3y - 2 = 0andx + y - 6 = 0$ respectively. Find the equation of the altitude through the vertex A.

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158. Find the equation of line parallel to the y-axis and drawn through the point of intersection of $x - 7y + 5 = 0$and $3x + y = 0$.

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159. Find the equation of the line parallel to y-axis and drawn through the point of intersection of the lines $x - 7y + 5 = 0\ and\ 3x + y = 0$.

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160. Find the coordinates of the foot of perpendicular from the point $(-1, 3)$to the line $3x - 4y - 16 = 0$.

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161. Two lines cut on the axis of x intercepts 4 and -4 and on the axis of y intercepts 2 and 6 respectively. Find the coordinates of their point of intersection.

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162. Find the coordinates of the orthocentre of a triangle whose vertices are $(-1, 3)(2, -1)$ and $(0, 0)$. [Orthocentre is the point of concurrency of three altitudes].

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163. Find the coordinates of the incentre and centroid of the triangle whose sides have the equations $3x - 4y = 0, 5x + 12y = 0$ and $y - 15 = 0$.

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164. Find the coordinats of the incentre of the triangle whose sides are $x = 3, y = 4$ and $4x + 3y = 12$. Also find the centroid.

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166. Find the circumcentre of the triangle whose vertices are $(-2, -3), (-1, 0), (7, -6)$.

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167. Find the orthocentre of the triangle whose vertices are (0, 0), (6, 1) and (2, 3).

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168. Two vertices of a triangle are $(4, -3)$ and $(-2, 5)$. If the orthocentre of the triangle is at $(1, 2)$,then the third vertex is

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169. Find the orthocentre of the triangle the equations of whose sides are $x + y = 1, 2x + 3y = 6 and 4x - y + 4 = 0.$

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170. Find if the following lines are concurrent.

$5x - 3y - 4 = 0, x - 5y + 7 = 0, 6x - 17y + 24 = 0$

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171. Examine whether the following three lines are concurrent or not. If yes, find the point of concurrenty

$2x + 3y - 4 = 0, x - 5y + 7 = 0, 6x - 17y + 24 = 0$

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172. For what value of m are the three lines $y = x + 1, y = 2(x + 1)$ and $y = mx + 3$ concurrent ?

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173. Find the value of m so that the lines $3x + y + 2 = 0, 2x - y + 3 = 0$ and $x + my - 3 = 0$ may be concurrent.

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174. Find the value of m for which the lines $mx + (2m + 3)y + m + 6 = 0 and mx + (2m + 1)x + (m - 6)y + 9 = 0$ intersect at a; point on $y - a\xi s$.

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175. Find the value of m so that lines $y = x + 1, 2x + y = 16$ and $y = mx - 4$ may be concurrent.

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176. If the lines $2x + y - 3 = 0, 5x + ky - 3 = 0$ and $3x - y - 2 = 0$are concurrent, find the value of k.

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177. If the three lines $ax + a^2y + 1 = 0,\ bx + b^2y = 1 = 0\ and\ cx + c^2y + 1 = 0$ are concurrent, show that at least two of three constants $a, b,\ c$ are equal.

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178. Show that the straight lines $L_1 = (b + c)x + ay + 1 = 0,\ L_2 = (c + a)x + by + 1 = 0\ nd\ L_3 = (a + b$ are concurrent.

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179. Given a tringle with vertices $A(-2,3), B(-4,1)$ and $C(2,5)$. Find the equations of the medians.

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180. The coordinates of points A, B and C are $(1,2), (-2,1)$ and $(0,6)$. Verify if the medians of the triangle ABC are concurrent..

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181. Show that the perpendicular bisectors of the sides of the triangle with vertices $(7,2), (5,-2)$ and $(-1,0)$ are concurrent. Also find the coordinates of the point of concurrence (circumcentre).

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182. Show that the perpendicular bisectors of the sides of a triangle are concurrent.

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183. Altitudes the perpendiculars drawn from the vertices of a triangle to the opposite side are known as the altitudes of the triangle.

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184. Find the angle between the lines $x + 3y - 8 = 0$ and $2x - 3y + 6 = 0$.

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185. Find the obtuse angle between the straight lines $9x + 3y - 4 = 0$ and $2x + 4y + 5 = 0$.

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186. Find the angle between the lines $x = a \; and \; by + c = 0.$

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187. Find the angle between the lines $3x = 5 \text{ and } 3x + 5y - 2 = 0.$

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188. Find angles between the lines $\sqrt{3}x + y = 1$and $x + \sqrt{3}y = 1.$

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189. Find the tangent of the angle between the lines which have intercepts 3, 4, and 1, 8 on the $x \text{ and } y$ axes respectively.

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190. Find the tangent of the angle between the lines whose intercepts on the axes are respectively a,–b and b,–a

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191. Find the angle between the line joining the points (2, 0), (0, 3) and the line $x + y = 1$.

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192. The line through $(4, 3)$ and $(-6, 0)$ intersects the line $5x + y = 0$. Find the angles of intersection.

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193. Prove that the line $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} - \frac{y}{a} = 1$ are perpendicular to each other.

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194. Show that the line joining $(2, -3)$ and $(-1, 2)$ is perpendicular to the line joining $(3, 7)$ and $(-2, 4)$.

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195. A line passing through the points $(a, 2a)$ and $(-2, 3)$ is perpendicular to the line $4x + 3y + 5 = 0$, find the value of a.

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196. If the vertices of triangle have rational coordinates, then prove that the triangle cannot be equilateral.

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197. Prove that the line $k^2x + ky + 1 = 0$ is perpendicular to the line $x - ky = 1$ for all real values of $k(\neq 0)$.

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198. For what value of k is the line $x - y + 2 + k(2x + 3y) = 0$ parallel to the line $3x + y = 0$?

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199. Prove that the lines $2x - 3y + 1 = 0,\ x + y = 3,\ 2x - 3y = 2\ and\ x + y = 4$ form a parallelogram.

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200. If $x\cos\theta + y\sin\theta = 2$ is perpendicular to the line x-y =3 then what is one of the value of θ?

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201. If the line $x - 3y + 5 + k(x + y - 3) = 0$, is perpendicular to the line $x + y = 1$, and k.

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202. The line through the points (h, 3) and (4, 1) intersects the line $7x - 9y - 19 = 0$ at right angle. Find the value of A.

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203. Examine which of the pair of lines are intersecting, parallel, perpendicular or coincident : $x - 2y + 3 = 0$ and $2x - 4y + 5 = 0$

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204. Examine which of the pair of lines are intersecting, parallel, perpendicular or coincident : $2x + 3y + 5 = 0$ and $4x + 6y + 10 = 0$

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205. Examine which of the pair of lines are intersecting, parallel, perpendicular or coincident : $x - y + 1 = 0$ and $x + y + 2 = 0$

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206. Examine which of the pair of lines are intersecting, parallel, perpendicular or coincident : $x - y + 2 = 0$ and $2x - 3y + 5 = 0$

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207. Two lines passing through the point (2, 3) make an angle of 45^0 . If the slopeof one of the lines is 2, find the slope of the other

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208. Two lines passing through the point (2,3) intersect each other at an angle 60^0 . If slope of one line is 2, find the equation of the other line.

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209. Find the slope of the lines which makee an angle of 45^0 with the line $x - 2y = 3$

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210. Find the equations of the straight lines passing through (2,-10) and making and angle of 45^0 with the line $6x + 5y - 8 = 0$

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211. Find the equation of the legs of a right isosceles triangle if the equation of its hypotenuse is $x - 2y - 3 = 0$ and the vertex of the right angle is at the point $(1, 6)$,

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212. The hypotenuse f a right isosceles triangle has its ends at the points (1,3) and (-4,1). Find the equations of the legs (perpendicular sides) of the triangle.

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213. Find the equation of the straight lines passing through the origins and making an angle of 45^0 with the straight line $\sqrt{3}x + y = 11$.

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214. Find the equation of the two straight lines through $(1, 2)$ forming the two sides of a square of which $4x + 7y = 12$ is one diagonal

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215. A line through the point $P(1, 2)$ makes an angle of 60^0 with the positive direction of x-axis and is rotated about P in the clockwise direction through an angle 15^0. Find the equation of the straight line in the new position.

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216. The equation of lines passing through point (x_1, y_1) and making angle α with the line $y = mx + c$ are given by :

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217. A line $x - y + 1 = 0$ cuts the y-axis at A. This line is rotated about A in the clockwise direction through 75°. Find the equation of the line in the new position

(A) $\sqrt{3}y + x = \sqrt{3}$ (B) $\sqrt{x} + y = \sqrt{3}$ (C) $x + \sqrt{y} = 1$ (D) $\sqrt{x} + y = 1$

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218. The slope of a line is double of the slope of another line. If tangents of the angle between the is find the slopes of the other line.

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219. Find the equations of the lines which pass through the point $(4, 5)$ and make equal angles with the lines $5x - 12y + 6 = 0$ and $3x = 4y + 7$

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220. If the lines $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$, then $m =$

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221. A ray of light passing through the point (1, 2) reflects on the xaxis at point A and the reflected ray passes through the point (5, 3). Find the coordinates of A.

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222. Let $(2, 1), (-3, -2)$ and (a, b) form a triangle. Show that the collection of the points (a, b) form a line for which the triangle is isosceles. Find the equation of that line.

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223. Find the equation of the straight line parallel to $x + 2y = 3$ and passing through the point (3, 4).

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224. Find the equation of the line through $(-2, 3)$ parallel to the line $3x - 4y + 2 = 0$

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225. Find the equation of the line through $(-2, -1)$ and parallel to line $x = 0$.

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226. Find the equation to the straight line parallel to $3x - 4y + 6 = 0$ and passing through the middle point of the joint of points (2,3), and

(4,-1).

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227. Find the equation to the straight line passing through the point $(2, 1)$ and parallel to the line joining to point $(2, 3)$ and $(3, -1)$

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228. Find the equation of the straight line which passes through the point (α, β) and is parallel to the line $lx + my + n = 0$

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229. Find the equaiton of the line that has y-intercept 4 and is parallel to the line $2x - 3y = 7$.

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230. Prow that the line through the point $(x_1 > y_1)$ and parallel to the line $Ax + By + C = 0$ is $A(x - x_1) + B(y - y_1) = 0$.

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231. Find the equation of a straight line parallel to $2x + 3y + 11 = 0$ and which is such that the sum of its intercepts on the axes is 15.

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232. Find the equation of the line through point $(-2, -1)$ and perpendicular to the line $y = x$.

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233. Find the equation of the straight line passing through the point $(2, 5)$ and perpendicular to the line $2x + 5y = 31$.

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234. Find the equation of a line perpendicular to the line $x - 2y + 3 = 0$ and passing through the point $(1, -2)$.

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235. Find equation of the line perpendicular to the line $x \quad 7y \quad + \quad 5 \quad = \quad 0$ and having x intercept 3.

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236. Find the equation of a line drawn perpendicular to the line $\frac{x}{4} + \frac{y}{6} = 1$ through the point where it meets the y-axis.

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237. Find the equation of the straightline perpendicular to the line $7x + 2y + 7 = 0$ and passing through the origin.

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238. Find the equation of the straight line through the point (α, β) and perpendiculasr to the line $lx + my + n = 0$.

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239. Find the equation of the straight line through $(a\cos\theta, b\sin\theta)$ perpendicular to the line $\frac{x}{a\cos\theta} + \frac{y}{b\sin\theta} = 1$.

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240. Find the equation to the line through the point $(-4, -3)$ and perpendicular to the line joining the points $(1, 3)$ and $2, 7)$.

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241. Find the equation of the perpendicular bisector of the line segment joining the origin and the point $(4, 6)$.

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242. The line $y = 0$ divides the line joining the points (3, -5) and (-4, 7) in the ratio :

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243. Find the equation of the straight line perpendicular to $2x - 3y = 5$ and cutting off an intercept 1 on the positives direction of the x-axis.

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244. Find the equation of the straight line through (x_1, y_1) perpendicular to the line joining (x_2, y_2) and (x_3, y_3).

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245. Find the equation of the line that has y-intercept -3 and is perpendicular to the line $3x + 5y = 4$.

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246. Find the equation of a straight line drawn perpendicular to the line $\frac{x}{a} + \frac{y}{b} = 1$ through the point where it meets the y-axis.

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247. Find the coordinates of the foot of the perpendicular drawn from the point $(1, -2)$ on the line $y = 2x + 1$.

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248. Find the coordinates of the foot o the perpendicular from the point (-1, 3) to the line $3x - 4y - 16 = 0$

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249. Find the projection of the point (1,0) on the line joining the points (-1,2) and (5,4).

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250. Find the image of the point $(1, -2)$ with respect to the line mirror $2x - y + 1 = 0$

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251. Find the image of the point (1, 2) in the line $x - 3y + 4 = 0$.

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252. Find the image of the point (3,8) with respect to the line $x + 3y = 7$ assuming the line to be a plane mirror.

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254. If (h, r) is the foot of the perpendicular from (x_1, y_1) to $lx + my + n = 0$, prove that : $\frac{x_1 - h}{l} = \frac{y_1 - r}{m} = \frac{lx_1 + my_1 + n}{l^2 + m^2}$

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255. Find the equation of the straight line passing through the point $(2, -6)$ and the point of intersection of the lines $5x - 2y + 14 = 0$ and $2y = 8 - 7x$.

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256. Find the equation of the straight line whichpasses through the point $(1, 1)$ and the point of intersection of the lines $3x + 2y = 0$ and $x - 2y = 0$

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257. Find the equation of the line through the point of intersection of $x + 2y = 5$ and $x - 3y = 7$ and passing through the point $(0, -1)$

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258. Find the equation of the line through the intersection of $5x - 3y = 1$ and $2x + 3y - 23 = 0$, and perpendicular to the line whose equation is: $x = 0$

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259. Find the equation of the line through the intersection of $5x - 3y = 1$ and $2x + 3y - 23 = 0$, and perpendicular to the line whose equation is: $y = 0$

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260. Find the equation of the line through the intersection of $5x3y = \ 1$ and $2x + \ 3y\ 23\ = \ 0$ and perpendicular to the line $5x\ 3y\ 1\ = \ 0$.

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261. Find the equation of the line through the intersection of lines $x + 2y + 3 = 0$and $4x + y + 7 = 0$ and which is parallel to $5x + 4y + 20 = 0$

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262. Find the equation of line parallel to the y-axis and drawn through the point of intersection of $x\ 7y + 5 = 0$and $3x + y\ 7 = 0$.

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263. Find the equation to the straight line which passes through the point of intersection of the straight lines $x + 2y = 5$ and $3x + 7y = 17$ and is perpendicular to the straight line $3x + 4y = 10$

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264. Find the equation to the straight line drawn through the point of intersection of $x + 2y + 3 = 0$ and $3x + 4y + 7 = 0$ and perpendicular to $y - x = 8$.

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266. Find the equation of the straight line passing through the point of intersection of $2x + 3y + 1 = 0 and 3x - 5y - 5 = 0$ and equally inclined to the axes.

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267. Find the equation of the straight line which passes through the point of intersection of the lines $3x - y = 5$ and $x + 3y = 1$ and makes equal and positive intercepts on the axes.

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268. The sides AB and AD of a parallelogram ABCD are $2x - y + 1 = 0$ and $x + 3y - 10 = 0$ respectively and C is the point $(-1, -2)$. Find the equation of the diagonals AC.

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269. Using integration, find the area of the region bounded by the curve $x^2 = 4y$ and the line $x = 4y - 2$.

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270. Find the equation of the line through the intersection of the lines $2x + 3y + 4 = 0$ and $x + 5y = 7$ that has its x-intercept equal to 4.

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271. Find the equation of the line passing through the point of intersection of the lines $4x - 7y - 3 = 0 \, and \, 2x - 3y + 1 = 0$ that has equal intercept to axes.

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272. Prove that the family of lines represented by $x(1 + \lambda) + y(2 - \lambda) + 5 = 0, \lambda$ being arbitrary, pass through a fixed point. Also find the fixed point.

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273. Prove that the line $x(a+2b)+y(a-3b)=a-b$ passes through a fixed point for different values of a and b. Also find the fixed point.

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274. Prove that the equation represent a family of lines which pass through a fixed point. Also find the fixed point : (i) $(\gamma-1)x+\gamma y=1-3\gamma$

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275. Prove that the equation represent a family of lines which pass through a fixed point. Also find the fixed point : (ii) $\gamma x+y=4$

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276. Prove that all lines represented by the equation $(2\cos\theta + 3\sin\theta)x + (3\cos\theta - 5\sin\theta)y = 5\cos\theta - 2\sin\theta$ pass through a fixed point for all θ What are the coordinates of this fixed point ?

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277. Examine whether the points $(3, -4)$ and $(2, 6)$ are on the same or opposite sides of the line $3x - 4y = 9$?

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278. Show that (2, -1) and (1, 1) are an opposite sides of $3x + 4y = 6$.

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279. Find the position of the points $(3, 4)$ and $(-1, 1)$ with respect to the line $6x + y - 1 = 0$.

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280. Prove that the points of intersection of the line $x - y = 2$ with the parallel lines $2x + y = 7$ and $2x + y = 16$ are on the opposite sides of the line $x + y = 5$.

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281. Which one of the points $(1, 1), (-1, 2)$ and $(2, 3)$ lies on the side of the line $4x + 3y - 5 = 0$ on which the origin lies?

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282. Find the length of the perpendicular from the point $(-3, 4)$ to theline $3x + 4y - 5 = 0$

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283. Find the distance of the point $(3, \quad 5)$ from the line $3x \quad 4y \quad 26 \quad = 0$.

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284. Find the distance of the point P from the line l in that : $l: 12x - 7 = 0, P \equiv (3, -1)$

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285. Find the distance of the point P from the line l in that : $l: 12(x + 6) = 5(y - 2)$ and P-=(-3, -4)`

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286. Find the distance of the point P from the line l in that : $l: \frac{x}{a} - \frac{y}{b} = 1$ and $P \equiv (b, a)$

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287. Find the distance of the point P from the line l in that : $l: 12(x + 6) = 5(y - 2)$ and $P \equiv (-1, 1)$

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288. Find the distance of the point of intersection of the lines $2x + 3y = 21$ and $3x - 4y + 11 = 0$ from the line $8x + 6y + 5 = 0$

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289. In the triangle ABC with vertices A (2, 3), B (4, -1) and C (1, 2), find the equation and length of altitude from the vertex A.

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290. What are the points on x-axis whose perpendicular distance from the line $4x + 3y = 12\ is\ 4$?

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291. What are the points on y-axis whose distance from the line $\frac{x}{3} + \frac{y}{4} = 1\ is\ 4\ units$?

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292. Find the points on $y - ais$ whose perpendicular distance from the line $4x - 3y - 12 = 0$ is 3.

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293. Find the length of the perpendicular drawn from the origin upon the line joining the points (a, b) and (b, a)?

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294. Find the length of the perpendicular from the point (4,-70 to the joining the origin and the point of intersection of the lines $2x - 3y + 14 = 0\, nd\, 5x + 4y - 7 = 0$

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295. Find the equation of two straight lines which are parallel to $x + 7y + 2 = 0$ and at unit distance from the point $(1, -1)$.

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296. Find the equations of lines parallel to 3x-4y-5 = 0 at a unit distane from it.

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297. The equations of two lines through (0,a), which are at distance 'a' units from the point (2a, 2a) are

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298. Find the equations of the lines through the point of intersection of the lines $x - 3y + 1 = 0 \, and \, 2x + 5y - 9 = 0$ and whose distance from the origin is $\sqrt{5}$.

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299. Number of straight lines that can be drawn through the point $(1, 4, -1)$ to intersect the lines $L_1 and L_2$ is 0 (b) 1 (c) 2 (d) infinite

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300. If the length of the perpendicular from the point $(1, 1)$ to the line $ax - by + c = 0$ be unity, show that $\frac{1}{c} + \frac{1}{a} + \frac{1}{b} + = \frac{c}{2ab}$.

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301. Find perpendicular distance from the origin of the line joining the points $(\cos\theta, \sin\theta)$and $(\cos\varphi, \sin\varphi)$.

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302. If p and q are respectively the perpendiculars from the origin upon the striaght lines, whose equations are $x\sec\theta + y\cos ec\theta = a$ and $x\cos\theta - y\sin\theta = a\cos 2\theta, then 4p^2 + q^2$ is equal to

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303. The distance between the lines $4x + 3y = 11$ and $8x + 6y = 15$ is

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304. Find the distance between the parallel lines $3x + 4y + 7 = 0$and $3x + 4y + 5 = 0$.

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305. If sum of the perpendicular distances of a variable point $P(x, y)$from the lines $x + y - 5 = 0$and $3x - 2y + 7 = 0$ is always 10. Show that P must move on a line.

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306. Determine the distance between the following pair of parallel lines:

$4x - 3y - 9 = 0$ *and* $4x - 3y - 24 = 0$

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307. Find the distance between parallel lines(i) $15x + 8y - 34 = 0$and $15x + 8y + 31 = 0$(ii) $l(x + y) + p = 0$ and $l(x + y) - r = 0$.

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308. Find the distance between the parallel lines $3x + 4y + 7 = 0$and $3x + 4y + 5 = 0$.

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309. Find the distance between parallel lines(i) $15x + 8y - 34 = 0$and $15x + 8y + 31 = 0$(ii) $l(x + y) + p = 0$ and $l(x + y) - r = 0$.

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310. Prove that the lines $2x + 3y = 19 \, and \, 2x + 3y + 7 = 0$ are equidistant from the line $2x + 3y = 6$.

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311. Find the equation of the line midway between the parallel lines $9x + 6y - 7 = 0 \, and \, 3x + 2y + 6 = 0$.

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312. Find the perpendicular distance between the lines

$y = mx + c, y = mx + d$

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313. The equations of two sides of a square are $5x - 12y - 65 = 0 \, and \, 5x - 12y + 26 = 0$. Find the real of the square.

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314. The equations of two sides of a square whose area is 25 square units are $3x - 4y = 0$ and $4x + 3y = 0$. The equations of the other two sides of the square are

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315. Prove that the diagonals of the parallelogram formed by the lines $\sqrt{3}x + y = 0, \sqrt{3}y + x = 0, \sqrt{3}x + y = 1$ and $\sqrt{3}y + x = 1$ are at right angles.

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316. Prove that the diagonals of the parallelogram formed by the four lines $3x + y = 0, 3y + x = 0, 3x + y = 4, 3y + x = 4$ are at right angles.

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317. The equation of one side of a rectangle is $3x - 4y - 10 = 0$ and the coordinates of two of its vertices are $(-2, 1)$ and $(2, 4)$. Find the area of the rectangle and the equation of that diagonal of the rectangle which passes through the point $(2, 4)$.

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318. Show that the four lines $ax \pm by \pm c = 0$ enclose a rhombus whose area is $\frac{2c^2}{|ab|}$

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319. Prove that the product of the lengths of the perpendiculars drawn from the points $\left(\sqrt{a^2 - b^2}, 0\right)$ and $\left(-\sqrt{a^2 - b^2}, 0\right)$ to the line $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1$

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